

differences seem inconsequential and well within the possibilities of sculptural variation that might be expected in the species, especially in material from what could well be the northern and southern ends of its maximum geographical range. Nor will such an extension of range to the southward be any particular occasion for surprise for the reason that the chiton fauna of Guadelupe Island is composed largely, if not entirely, of species found living on the coast of southern California, as examination of the foregoing list shows. Incidentally, all lots of Lepidozona asthenes were collected intertidally, apparently in much the same type of habitat under small boulders and stones.

The specimens of Dendrochiton gothicus collected by Mr. Williams agree well with those dredged by John Q. Burch and others off San

Pedro and Redondo, and in the region of San Diego. Finding this species intertidally seems unusual as existing records are generally from depths of 25 fathoms or more. Earlier collections of D. gothicus, taken from the backs of Haliotis, probably came from shallower water, but more recently it has been taken only by dredging.

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Cowrie Populations from Kenya (Mollusca : Gastropoda)

BY

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The cowrie fauna of the Kenya coast is rather well known, especially by the papers of B. Verdcourt (1954-1962). For many years, Mr. R. S. Benton eagerly has collected cowries along this area, chiefly between Shimoni at the southern border of Kenya, and Shanzu some miles north of Mombasa (see below); from March 1961 to his leaving Kenya in June 1962, he has sent us 2,964 cowries from several localities, well preserved so that we could study the local variation of the shells as well as the relation of the characters of shells to the sex of the animal, and the variation of the radulae (see also Schilder, 1961c to 1963r).

LOCALITIES

The populations treated in the present paper have been collected at ten localities which are tabulated below. In this table, the six columns indicate the abbreviation (Ab.) used in this paper, name of the locality (Loc.), short description of the collecting field (Ecology), its general aspect towards the sea (Asp.), distance in kilometers and general direction from the central locality Mombasa Island (Dist.), and number of cowries sent to the writers (Cow.).

Ab.	Loc.	Ecology	Asp.	Dist.	Cow.
ShW ShE	Shimoni West Shimoni East }	Corals on sandy and muddy bottom some mangroves	{ S S }	75 S 75 S	246 559
Di	Diani	Small reefs in lagoon, bare reef	E	35 S	74
PR	Port Reitz	Tidal creek, sandy beach, dirty water	{ SE SW }	8-5 W	711
Mo	Mombasa Island	Rocky cliffs, some caves	N, E	—	795
Ny	Nyali	Rather bare reef	SE	1 N	66
Sha	Shanzu	Reef, many loose rocks	E	7 N	210
Ki	Kikambala	Sandy beach, corals in lagoon, reef	E	15 N	157
Ta	Takaungu	Cliffs and bare reef	E	40 N	99
Mi	Mida Creek	Sand beach and bare reef	SE	70 N	47

Discussion

The reefs are uncovered at low to very low tides only; there are loose rocks and pools so that the conditions of food and shelter vary at short distances. The monsoon blows from the south from April to October, and from the north from November to March; in the former period the sea is rougher and considerably cooler. ShW (350 m long) and ShE (70 m) are separated by a zone (350 m only) where no cowries can live; both collecting fields are very similar except that in ShE there is a spit of sand between the field and the deep channel, whereas ShW gently slopes down to it; this deep channel, which is two km broad, separates ShW and ShE from Wasin Island in the south (see Schilder, 1962r). Di includes some few specimens from Likoni (farther north). PR includes the north coast of the basin as well as Flora Point in the south (see Schilder & Benton, 1962e). Ny includes English Point; this locality is separated from Mo by a narrow channel only. The cowries from Ki have been sent by A. J. Wiley in 1958, without animals; we doubt whether all specimens really have been collected on the reef of Kikambala in strict sense. All data concerning these localities kindly have been communicated to the writers by Mr. R. S. Benton, formerly living at Nairobi and Mombasa.

The environmental conditions of all reef localities facing the open sea from Di to Mi evidently are rather similar, though the aspect of the reefs constantly changes. ShW and ShE seem to differ by rather muddy bottom as they face the channel separating Wasin Island from

the mainland; in this respect they seem to connect ecologically the reef localities with the only really aberrant collecting field PR, which lacks corals in its waters contaminated by harbour construction in the inland creek far off the open sea.

SPECIES

The following list contains all cowrie species reliably collected in southern Kenya between Shimoni and Kikambala; we have included rare species mentioned by Verdcourt from this region, but not found by Benton personally, and Zanzibar as indicated by Verdcourt, trying to arrange his various terms in five classes:

- C = common
- c = frequent
- m = less frequent
- r = rare
- R = very rare

These abbreviations have been used also by Mr. Benton in a list summarizing the results of many years' collecting in Kenya, and we quote his classification of the relative frequency of each species at each locality; between the columns of ShW and ShE there is one common letter of frequency only, as Mr. Benton did not separate them first, and in Ta and Mi (outside the chief area investigated) there are no letters at all as he has collected there once only. We have added to these degrees of frequency estimated by Benton the number of specimens actually sent us by him as a result of 16 months' collecting. The last column contains the aver-

age frequency of each species in southern Kenya resulting from Benton's letters, often differing from the frequency in entire East Africa indicated by Verdcourt, and the number of specimens sent us by Mr. Benton and Mr. Wiley (from Ki only). The absence of any letter or figure indicates that no specimens have been collected nor sent, respectively.

The cowrie species have been arranged according to our catalogue of living and fossil Cypraea (Schilder, 1941v). The gaps separate the three subfamilies Cypraeinae, Nariinae, and Cypraeovulinae.

{Editor's Note: Because of our policy of never allowing a trivial name to stand alone, we have editorially added throughout Drs. Schilder's paper the genus names as used by them; we also added authors and years in most cases. This makes certain changes in the following statement obvious.}

We renounced, however, to add the generic names so that conchologists adopting the views of Dr. Kay (1960) may put the family genus *Cypraea* before each specific name mentioned in this paper, though we stick to the generic division of the cowries by historical and taxonomi-

Verdict.	ShW	ShE	Di	PR	Mo	Ny	Sha	Ki	Ta	Mi	Sum
<i>Luria isabella</i> (Linnaeus, 1758):											
C	25	c 40	c 10		c 51	c 4	c 32	c 9		3	c 174
<i>Callistocypraea testudinaria</i> (Linnaeus, 1758):											
R			R				R				R
<i>Mauritia arabica immanis</i> Schilder, 1938:											
c			r 1		m 11	m 13		r		1	r 26
<i>Mauritia scurra</i> (Gmelin, 1791):											
R			R				R 2				R 2
<i>Mauritia histrio</i> (Gmelin, 1791):											
C		r	m 3		c 14	m 4	c 10	m 11			m 42
<i>Mauritia depressa</i> (Gray, 1824):											
R			R								R
<i>Mauritia mappa</i> (Linnaeus, 1758):											
R							R				R
<i>Mauritia mauritiana</i> (Linnaeus, 1758):											
c					m 23	r					r 23
<i>Talparia argus</i> (Linnaeus, 1758):											
R			R								R
<i>Talparia talpa</i> (Linnaeus, 1758):											
m		r 1	r			r		r 1			R 2
<i>Cypraea tigris</i> Linnaeus, 1758:											
C	2	m 5	c		c 6	c 3	c	c 10			c 26
<i>Cypraea lynx</i> Linnaeus, 1758:											
c	7	C 126	c 1		c 47	c	c 27	c 10	6	1	c 225
<i>Cypraea vitellus</i> Linnaeus, 1758:											
c	9	m 32	c 2	r 1	c 14	m	c 2	c 10			m 70
<i>Cypraea carneola</i> Linnaeus, 1758:											
C	43	C 128	c 3		C 49	m 3	c 24	c 13			c 263
<i>Cypraea titan</i> Schilder, 1962:											
	74	47					19	7			m 147
<i>Pustularia globulus</i> (Linnaeus, 1758):											
R			R								R
<i>Pustularia cicercula</i> (Linnaeus, 1758):											
R			R								R
<i>Monetaria annulus</i> (Linnaeus, 1758):											
C	21	C	C		C 173	C 20	C 1	C 10		35	C 260
<i>Monetaria moneta</i> (Linnaeus, 1758):											
C	1	m	m 9	C 273	r	m 12	c 2	c 20	88		c 405

Verdict.	ShW	ShE	Di	PR	Mo	Ny	Sha	Ki	Ta	Mi	Sum
<u>Erosaria gangranosa</u> (Dillwyn, 1817):											
R			R					R			R
<u>Erosaria helvola</u> (Linnaeus, 1758):											
C	13	m 15	c 23	m 7	C215	m 2	c 48	c 10		3	c 336
<u>Erosaria caputserpentis</u> (Linnaeus, 1758):											
C			r		r		m 1	r 11	5		r 17
<u>Erosaria poraria</u> (Linnaeus, 1758):											
R							R				R
<u>Erosaria erosa</u> (Linnaeus, 1758):											
c	31	c 72	c 1	c 15	c 8	m 2	c 4	c 6		1	c 140
<u>Erosaria marginalis</u> (Dillwyn, 1827):											
R			R				R 1			R	R 1
<u>Erosaria lamarckii</u> (Gray, 1825):											
c				c 298							r 298
<u>Staphylaea staphylaea</u> (Linnaeus, 1758):											
m	2	m 12	m 1		m 8		m 3	m 2		1	m 29
<u>Staphylaea limacina</u> (Lamarck, 1810):											
c	2	m 12	m 1		m 8	r 1	m 15	m 2		1	m 42
<u>Staphylaea nucleus</u> (Linnaeus, 1758):											
r			r				R 2				R 2
<u>Erronea onyx adusta</u> (Lamarck, 1810):											
r				m 17							r 17
<u>Erronea caurica</u> (Linnaeus, 1758):											
C	3	m 2	c 1	c 100	c 55	m	c	c 21			c 182
<u>Palmadusta felina</u> (Gmelin, 1791):											
m					r 2		r				R 2
<u>Palmadusta punctata</u> (Linnaeus, 1758):											
m		r 9	R 4				R 1				r 14
<u>Palmadusta asellus</u> (Linnaeus, 1758):											
m		R 1									R 1
<u>Palmadusta clandestina</u> (Linnaeus, 1767):											
r	1	r	m 1		m 8	m 2	m	m		1	m 13
<u>Palmadusta ziczac</u> (Linnaeus, 1758):											
R			R								R
<u>Palmadusta diluculum</u> (Reeve, 1845):											
c			r	r			r				R
<u>Palmadusta fimbriata</u> (Gmelin, 1791):											
m		r	m 8		c 64		m 6	r 1			m 79
<u>Palmadusta microdon</u> (Gray, 1828):											
R			R								R
<u>Cribraria teres</u> (Gmelin, 1791):											
m	6	m 17	m		m 28		m 3	m			m 54
<u>Blasicrura kieneri</u> (Hidalgo, 1906):											
C	1	m	m 2		m 7		m 5	m 3			m 18
<u>Blasicrura owenii</u> (Sowerby, 1837):											
R			R 1								R 1
<u>Blasicrura stolidia</u> (Linnaeus, 1758):											
r	3	r 32									r 35
<u>Cribraria chinensis</u> (Gmelin, 1791):											
m	2	r 8	m 2		m 2		r 2	r			r 16
<u>Cribraria cribraria</u> (Linnaeus, 1758):											
m			r		r 2		r				r 2
SUM (45 species):											
	246	559	74	711	795	66	210	157	99	47	2964

cal, especially by paleontological and even by anatomical reasons, as the grouping of species published by Kay mostly confirms our systema; besides, if uniting all species to one genus only, several changes in specific names would be necessary by homonymy so long as one does not separate them generically once more. We shall discuss the matter in another paper.

Along the southern Kenya coast, Monetaria annulus evidently is the most common species; eight other species (Luria isabella, Cypraea tigris, C. lynx, C. carneola, C. moneta, Erosaria helvola, E. erosa, Erronea caurica) are also frequent, while nine species (Mauritia histrio, C. vitellus, C. titan, Staphylaea staphylaea, S. limacina, Palmadusta clandestina, P. fimbriata, Cribraria teres, Blasicrura kieneri) are less frequent; the remaining 27 species are rare to very rare.

The populations inhabiting the fringing reefs along the southern Kenya coast (Di, Mo, Ny, Sha, Ki) are rather similar with regard to the frequency of species, though there are some local peculiarities: Cypraea carneola, Erosaria helvola, and Palmadusta fimbriata evidently are more frequent in Mo than elsewhere, whereas C. titan is absent.

The populations living at Shimoni on the northern shore of the Wasin Channel evidently differ by the absence of the solid species Mauritia arabica, M. histrio, M. mauritiana, and Erosaria caputserpentis, which are replaced by the only occurrence of Blasicrura stolidus and by increased frequency of Cypraea lynx, C. carneola, and C. titan with less calloused margins; besides, Monetaria moneta, E. helvola, and Palmadusta fimbriata seem to be less frequent at Shimoni than at the localities along the open sea. The predominancy of C. titan over C. carneola in ShW, contrary to that of C. carneola

over its sibling ally at ShE, has been discussed by Schilder (1962r).

The population living in the harbour of Port Reitz is quite different: both groups of species enumerated above as absent and as abundant at Shimoni are totally absent in PR, as is Luria isabella and the species most common elsewhere, Monetaria annulus; they are replaced by an increased number of M. moneta and evidently also of Erronea caurica, and by two species collected in no other place in southern Kenya by Benton: Erosaria lamarckii and the less frequent Erronea onyx.

In southern Kenya Erosaria erosa seems to be the only species occurring at all localities in rather similar percentage.

SEX

Among 2,179 adult cowrie specimens with well preserved animals, 1,179 females have been stated by absence of a penis; these 54±1.1 percent of females significantly differ from the theoretically expected 50 percent, so that the females evidently predominate a little ($P < 0.001$).

Nevertheless, in several species the percentage of females much differs from the average 54 percent, especially in Erosaria lamarckii (36±4.5), Luria isabella (47±4.2), and Palmadusta fimbriata (69±6.0), but only the first named difference is significant ($P < 0.001$): this scarceness of females in 115 E. lamarckii (with animals) from Port Reitz cannot be caused by local conditions, as in 260 Monetaria moneta from the same locality the females are significantly predominant (60±3.04 percent, $P < 0.001$).

If we comprise several allied species, or similar localities, we detect interesting differences, as follows.

animals	group	females (percent)
833	Cypraeinae (<u>Luria isabella</u> ; <u>Cypraea titan</u>)	50 ± 1.7
1048	Nariinae (<u>Monetaria annulus</u> ; <u>Staphylaea limacina</u>)	55 ± 1.5
298	Cypraeovulinae (<u>Erronea onyx</u> ; <u>Cribraria chinensis</u>)	61 ± 2.8
1221	From channel localities (ShW, ShE, PR)	52 ± 1.4
958	From reef localities facing the open sea	57 ± 1.6

Therefore, in Cypraeinae the females are relatively less frequent than in Cypraeaovulinae (the difference is significant: $P < 0.001$), the Nariinae are intermediate. In the three channel localities the females are evidently less frequent than in the seaside reefs, though this difference is much less significant ($P < 0.05$, but > 0.02). It seems difficult to explain all these facts.

VARIATION

Various sets of any species collected in different times at the same locality never differ significantly each from the other in any character of the shell nor of the radula: slight differences between the means never exceed the limits of random generally admitted in statistics. In a former paper (Schilder, 1962m), we have published the variation of several characters of shell, animal, and radula in Monetaria moneta, from PR, collected 27 August 1961; the means of these 180 shells (92 radulae) do not differ significantly, in any character discussed, from a second set containing 80 shells (72 radulae) collected at PR 25 October 1961; the characters of 73 and 25 Erronea caurica collected there the same days are practically identical, too. The means of various characters of 30, 31, and 29 Cypraea carneola (C. titan excluded) collected at ShE 28 August 1961, 23 November 1961, and 5 April 1962, respectively, also agree within the admitted limits.

On the other hand, populations coming from different localities often differ in various characters in a significant way.

The most striking character of cowrie shells is their size. The following table indicates the mean of length (in mm) of several populations (20 to 260 shells); they have been arranged according to the lengths of shells and connected by the signs: o, *, and **, which indicate increasing significance of $P > 0.01$, $P < 0.01$, and $P < 0.001$, respectively (see Schilder, 1962r, 1963r; the means have been calculated in tenths of mm).

The fact that Mo is mostly represented on the left border of this list and ShE on its right border apparently points to some general influence of the ecological conditions to the relative size in many or even in all species.

Such a local parallelism may be illustrated by expressing each local mean in percent of the average length of the species in the western Indian Ocean (the Red Sea and South Africa excluded), i. e., in the tropical coast of East Africa (Benton's Kenya localities excluded) and in the adjacent islands from Madagascar to Chagos Archipelago. We prefer, however, to express the figures in parts of 20 instead of in parts of 100, so that the difference 1 is equal to 5 percent. The following table shows on its left column the length of rather frequent species in the Indian Ocean (in mm); the following columns indicate the differences of the local means from this general size equal to index 20. The right column and the lowest line contain the means of each species in the whole area of Kenya investigated by Benton, and the general influence of each locality on all cowries, respectively. Local series of less than four specimens of a species have been omitted in this table, but proportionally considered when we have calculated the horizontal and vertical means.

The total mean 19.7 shows that the cowries from Benton's collecting fields generally are about 1.5 percent smaller than those living abroad in the western Indian Ocean. Some species, however, as Blasicrura stolidus, Palma-dusta fimbriata, and Mauritius arabica immanis distinctly exceed the usual means, while Staphylaea limacina and P. clandestina are smaller than in other regions. The mean size of all cowries is rather similar in most localities of Kenya, except in Mo, where most species are unusually small, and in ShE where all species tend to gigantism (the mean 20.4 in the adjacent ShW, however, far less exceeds the usual size).

The other measurable characters of the shells can be treated in an analogous way: the relative breadth (expressed in percent of length)

<u>Luria isabella</u>	Mo	24	o	Sha	25	o	ShW	26	**	ShE	30	(Mo ** ShW; Sha ** ShE)
<u>Cypraea lynx</u>	Mo	31	**	Sha	36	**	ShE	39				
<u>Cypraea carneola</u>	Mo	24	**	Sha	27	**	ShW	29	**	ShE	31	
<u>Cypraea titan</u>	Sha	45	o	ShW	47	**	ShE	54				
<u>Monetaria annulus</u>	ShW	20	o	Mo	20	*	Mi	22				
<u>Monetaria moneta</u>	Ta	21	**	Ki	23	o	PR	24				
<u>Erosaria helvola</u>	Mo	18	**	Sha	20							
<u>Erosaria erosa</u>	ShW	33	o	ShE	33							
<u>Erronea caurica</u>	Mo	31	**	PR	34							

	mm	ShW	ShE	Di	PR	Mo	Ny	Sha	Ki	Ta	Mi	Mean
<u>Luria isabella</u>	27	20	22	19		17	(20)	18	20			19
<u>Mauritia arabica immanis</u>	72					21	23					22
<u>Mauritia histrio</u>	57					21	(23)	19	19			21
<u>Mauritia mauritiana</u>	79					21						(21)
<u>Cypraea tigris</u>	85		21			19			17			19
<u>Cypraea lynx</u>	35	21	22			18		21	20	20		20
<u>Cypraea vitellus</u>	41	20	24			17			20			20
<u>Cypraea carneola</u>	29	20	22			17		19	22			20
<u>Cypraea titan</u>	49	19	22					19	18			19
<u>Monetaria annulus</u>	21	19				19	20		20		21	20
<u>Monetaria moneta</u>	21			19	23		17		22	20		20
<u>Erosaria helvola</u>	20	23	23	21	18	18		21	22			21
<u>Erosaria caputerpentis</u>	32								17	18		18
<u>Erosaria erosa</u>	32	20	21		18	19		(23)	21			21
<u>Erosaria lamarckii</u>	39				16							(16)
<u>Staphylaea staphylaea</u>	17		22			16						19
<u>Staphylaea limacina</u>	24		20			14		14				16
<u>Erronea onyx</u>	43				19							(19)
<u>Erronea caurica</u>	37				18	17			20			19
<u>Palmadusta punctata</u>	15		23	(16)								20
<u>Palmadusta clandestina</u>	17					16						17
<u>Palmadusta fimbriata</u>	12			25		20		21				22
<u>Cribraria teres</u>	30	22	23			17						20
<u>Blasicrura kieneri</u>	18					19		18				18
<u>Blasicrura stolidia</u>	25		24									(24)
<u>Cribraria chinensis</u>	32		22									20
Mean		20	22	20	19	18	20	19	20	19	20	19.7

and the closeness of teeth (Schilder, 1958z). If compared with specimens from other regions of the western Indian Ocean as limited above (the mean figures have been adopted from Schilder, 1952d), Mauritia mauritiana, Cypraea tigris, and Erosaria caputserpentis are broader in the Kenya populations (index 21), while C. titan and Cribraria chinensis are more slender (19). In C. teres and C. chinensis (more than in Erronea onyx and Palmadusta punctata) the teeth of both lips are unusually close (index 22 to 23), while in Blasicrura kieneri the labial teeth exceed only, and in Staphylaea limacina the columellar ones only; in M. arabica and Cypraea tigris the labial teeth are too close and the columellar teeth are too distant (index 21: 18); whereas in P. fimbriata (and M. histrio) the labial teeth are unusually distant (18), and in M. mauritiana the teeth of both lips are rather scarce (index 19:19). Generally, in the

Kenya populations the teeth of both lips are relatively more close in the species belonging to the progressive subfamilies Nariinae and Cypraeovulinae (index 21) than in the more primitive Cypraeinae (index 20).

The next table illustrates the general tendency of all cowrie species in each locality of Kenya. The figures indicate classes of 5 percent as explained above (20 is equal to 100 percent); they refer to four characters of the shell (L = length, BL = relative breadth, LT and CT = closeness of labial and columellar teeth, respectively), as well as to three characters of the radula ribbon (dr/L) (see Schilder, 1963r). On the contrary to the characters of the shell, the percentage of those of the radula refers to the sum of Kenya localities, as the radula of most species from the Indian Ocean outside Kenya is unknown.

Loc.	L	BL	LT	CT	r/12	m/L	dr/L
ShW	20	19	21	21	20	19	19
ShE	22	20	21	21	20	19	19
Di	20	20	20	20	20	21	21
PR	19	21	20	21	20	19	18
Mo	18	20	20	20	20	20	20
Ny	20	20	20	20	20	21	20
Sha	19	20	20	20	20	21	21
Ki	20	20	21	20	—	—	—
Ta	19	21	21	20	(20)	(22)	(22)
Mi	20	20	20	20	20	19	20
Mean	19.7	20.1	20.4	20.3	20.0	20.2	20.1

One will observe that, besides the increased size of all species in ShE and the reduced size in Mo discussed above, the shells from PR (and Ta) are broad, those from ShW are slender. In both collecting fields at Shimoni (ShW and ShE) the teeth are more numerous on both lips: this parallelism points to the reality of the difference probably caused by environmental conditions, whereas the scattered figures 21 in three other localities may be accidental only. There is no difference in the number of radula rows among the Kenya populations; according to the columns m/L and dr/L, however, the radulae of reef localities (especially in Di, Sha, and Ta) show a distinct tendency to become relatively large (broad and long), whereas in all channel localities (ShW, ShE, and PR) they are evidently too small (narrow and short) if compared with the size of the shells; the dependence of the relative size of the radula upon local conditions probably concerning food is striking.

The distribution of other varieties in structure and color is rather equal in the populations from southern Kenya, though there are several local differences in percentage of varieties indicating some influences of habitat. So, for instance, in *Monetaria annulus* the ecotype A (Schilder, 1932d, p. 99) predominates in all populations, with tendencies towards Q in Mi and Ny, and towards H in ShW. In *Monetaria moneta* the ecotype R predominates, tending towards S (margins sharply expanded) in Ki and towards C (margins roundly swollen) in PR (Schilder, 1962m, p. 100); in *M. moneta* the presence of an orange ring decreases from Di>Ta>Ki>Ny>PR, whereas the "golden" suffusion increases from Di=Ta=Ny>Ki>PR, showing some inverse correlation. In *Erosaria helvola* the predominance of the white specks (Schilder, 1952d, p. 79) de-

creases from Di>Ki=Sha>Mo=ShE>ShW, where the brown spots predominate. In *E. erosa* the marginal swelling increases from ShW<ShE<Mo<Sha<PR, indicating a surprising parallelism to the development of the lateral blotches from ShW<ShE<Mo<Sha<PR, where even the labial blotch is never absent. In *Erronea caurica* the dorsal blotch generally is less developed in PR, if compared with Ki and Mo. Extreme individual varieties, as *Cypraea vitellus* with richly vinous base, *E. erosa* with well developed basal lines (recalling *C. nebrites*), etc., as well as several species dorsally suffused with greenish enamel, sporadically occur in many localities, but no rostrate specimens have been observed among the 3,000 shells from Kenya.

Summary

The statistical analysis of cowrie populations coming from ten localities in southern Kenya show a pretty large uniformity among the seaside reef localities, whereas the populations coming from the Wasin Channel and from the inland creek Port Reitz distinctly differ both in selection of species and in predominance of certain varieties of shell and radula.

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NOTES & NEWS

The Terebridae (Mollusca : Gastropoda) of Bileau Island, Madang Harbour, New Guinea

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Through the courtesy of Mrs. Isobel Pert, I have recently had the opportunity to examine and study a large number of Terebridae specimens collected by her at Bileau Island, Madang Harbour, Territory of New Guinea (rounded to nearest degree as 6° 0' S. Lat.; 146° 0' E. Long.).

The collecting area consists of a reef approximately 40 to 60 yards in width extending offshore on the east and southeast sides of the island. This reef, about one-half mile in length, has a maximum tide variation of two and one-half feet. Due to the limited areas of sand and silt-filled pockets on this reef, no dredging has been attempted; all specimens have been collected with the aid of a glass-bottom bucket after raking of the bottom deposits. A deep ship channel drops abruptly from the seaward side of the reef, and this, along with the prevalence of sharks, had made collecting impractical in waters deeper than three feet.

It is of interest to observe that Mrs. Pert's collecting has resulted primarily in large quantities of minute and small juvenile specimens; large adult specimens have seldom been taken in this immediate area. The island is enhanced as a habitat for juveniles by a seaward island which keeps the water in a relatively calm condition and by a large silted crater resulting from World War II.

Mrs. Pert's residence on Bileau Island during 1961-1962 has made year-round collecting possible at this location with the present specimens, all live-taken, having been collected during this time. Of additional interest is Mrs. Pert's observation that Terebridae can always be found on the island at a location where the natives habitually discard edible refuse, meat tins, etc.

The following species have been obtained as a result of Mrs. Pert's intensive and competent collecting at Bileau Island during 1961-1962:

Terebra (Decorihastula) affinis Gray, 1844 (non Turton, 1932)

T. striata Quoy & Gaimard, 1832 (non Gray, 1844; non Basterot, 1825)

T. eburnea Hinds, 1844 (non Philippi, 1846; non Dunker, 1825)

T. pertusa Kiener, 1838 (non Bron, 1780; non Sowerby, 1897)

Terebra (Subula) areolata (Link, 1806) (non Adams & Reeve, 1850)

T. muscaria Lamarck, 1822

Terebra (Subula) argus Hinds, 1844

T. nebulosa Kiener, 1860 (non Sowerby, 1825; non Lorois, 1858)